

**Creating Beauty with Your Own Two Hands:
A simplified approach for direct composite veneers.**

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Private Practice

Introduction

Every day, dental clinicians are faced with the challenge of assisting patients in the decision of how to achieve the cosmetic effect they desire for their smile. As more information about health and beauty becomes available to the masses through the myriad of available educational and promotional resources, patients become empowered with the magnificent tool of knowledge. Dental practitioners today must be equipped both technically and verbally to address the complex concerns and desires of patients presenting for esthetic reconstruction. Actual needs must be discerned from the patients wants and the prescribed treatment must address the patient's implied and understood expectations, as well as coincide with proper dental health and function. If dentists are unable or unwilling to take the time necessary to educate patients and communicate the options available to them, a sacrifice in optimum results may occur. The hallmark of a truly conscientious esthetic dentist is one who takes the time to listen to the patient, develop an understanding of the treatment goals, and communicate all of the acceptable alternatives available. Quite often this includes minimally invasive procedures such as orthodontics, vital tooth bleaching, or conservative bonding procedures. Highly invasive procedures such as full coverage crowns and indirect laminates or inlays certainly have their place in the modern esthetic practice, but should be reserved for those cases where conservative techniques would be structurally inappropriate or definitively unacceptable to the patient.

Direct Bonding: An Integral Part of the Esthetic Dentist's Armamentarium

Dentists that automatically default to indirect procedures as their primary solution for all esthetic problems do a tremendous disservice to their patients and demonstrate a reckless disregard for tooth conservation, opposing wear, and the financial considerations of the patient. Furthermore, it is the author's opinion that the indiscriminant delegation of esthetics to laboratory

technicians has enabled many practitioners to abandon their own skills in creating dental morphology and color. By developing and exercising the skills and techniques associated with direct bonding, the clinician may develop a unique and deeper understanding of complex dynamics associated with smile reconstruction. With modern direct bonding techniques and materials, practitioners are able to mask aberrant stains and inappropriately dark tooth structure, create illusions of length and width, develop esthetic gingival and incisal embrasures, and control tissue contours to alleviate negative interdental space.¹ Additionally, learning to create vitality through polychromatic stratification of color, eliminating negative “show-through” with proper opacities and body materials, as well as developing proper edge position, gingival zenith, and surface morphology, give the practitioner immeasurable depth that parlays to other disciplines such as indirect restorative procedures. Just as the conductor of an orchestra must understand each instrument in order to lead a symphony, clinicians that physically understand the complex dynamics of esthetic restoration construction can better communicate, and therefore delegate, the fabrication of an indirect restoration to a technician when the conditions dictate.

Case Report

A 37 year old female (**Figure 1**) presented for esthetic evaluation with the desire of close existing spaces and lightening the shade of her teeth. This patient had had numerous consultations presenting a variety of treatment plans over the course of her life, and the patient was forthright with her economic concerns and desires to conserve as much tooth structure as possible.

Diagnosis

Clinical examination of the patient revealed a number of remarkable findings (**Figures 2,3**). The patient presented with 2 retained primary teeth, the primary left maxillary cuspid (H), and the primary left mandibular primary 1st molar (L). The patient was aware of her impacted

permanent left cuspid (11), and had been advised to have it surgically exposed and orthodontically repositioned numerous times throughout her life. However, the patient rejected this treatment plan, and was seeking alternative treatment. Radiographic analysis of the impacted cuspid was unremarkable, and both primary teeth lacked mobility and appeared to be ankylosed radiographically. The retention of these primary teeth resulted in poorly developed alveolar width and a unilateral cross-bite was evident in this arch segment. Numerous rotations, isolated mandibular crowding, and multiple diastemata of differing widths complicated the treatment plan. Both periodontal and carious assessments were negative, and the patient exhibited excellent homecare. No signs or symptoms of temporomandibular dysfunction were noted.

Treatment Plan

Numerous options were presented, and recommendations for retrieving the impacted cuspid and orthodontics, or removal and replacement of the retained primary teeth were flatly rejected by the patient. Pursuant to the patient's request for the most economical cosmetic solution, and the questionable longevity of the ankylosed primary cuspid, 10 directly bonded composite veneers were recommended.

This plan offered numerous advantages. First and foremost, it represented the most economical, and conservative way to achieve the desired results.² Indirect laminates, crowns, bridges, implants, with and without orthodontic improvement, were presented as more durable options. Each was rejected due to cost, invasiveness, and disregard for healthy tooth structure by the patient. Additionally, directly bonded composite veneers could be performed in fewer appointments and provided the least amount of opposing wear against the intact mandibular dentition.^{3, 4} What was most attractive about this approach was that the overall plan was not dependent on the retention of the primary cuspid. Since the patient was aware that she may lose

the primary canine at some point in the future, she desired to invest the least amount of money improving it's appearance, with the option to replace it with a single implant when required.

Procedure

Preoperative study models and a bite registration were made and the casts were mounted on a semi-adjustable articulator. Preparations were performed on the model, and a wax-up completed. Care was taken to assure that the maxillary left crossbite present on (H) and (#12) were corrected, and the patient was placed in group function during left working movements to avoid excessive forces on the primary cuspid. The diastemata were closed, the axial inclinations of teeth and embrasures were appropriately aligned, and the rotations were corrected. In cases such as this one where bonding resin will extend through diastemata and onto the lingual surfaces (occurs most often when correction of rotations and the formation of a new edge position will be facial to the existing edge position), it is imperative that the lingual anatomy on the wax-up be as accurate as possible. The finalized wax-up was presented to and approved by the patient.

A silicone index of the finalized wax up was created with **Sil Tech** (Ivoclar/Williams) lab putty. The purpose of this index is multifold. The index accurately and quickly enables the clinician to construct 4 essential elements of the final product: Lingual anatomy, the lingual "scaffold" for the diastemata closure, the incisal edge position, and the general occlusal scheme. Since one of the major obstacles facing clinicians considering mastering complex direct bonding cases is the time involved, this index is mandatory in that it enables the clinician to complete 50% of the case in minutes. Guidelines for proper construction is that it be of adequate thickness such as to resist easy displacement upon insertion (roughly 6-10mm), and that it is an accurate representation of the lingual embrasures, lingual anatomy, gingival sulci, and incisal edge thickness and position. This index can be formed directly over the wax up, and should extend

distally beyond the teeth to be bonded, and cover the entire lingual surface and extend 10mm onto the palatal tissues. The facial portion of the index should be trimmed to expose all but 2mm of the incisal edge to allow for enough visualization to confirm proper seating of the index during the operative procedure (**Figure 4**).

Clinical Procedure

The patient was anesthetized with local anesthetic in the areas where preparations were indicated into dentin to permit proper arch form. The preparations followed the “prescription” created on the diagnostic models. A slight chamfered finish line was created on all teeth with a tapered chamfer diamond (**LVS4, Brasseler, USA**). The silicone index created from the wax up was tried in repeatedly to assure sufficient reduction to allow for the creation of new incisal edges in composite at the new smile line. Significant reduction was required on tooth #10 to correct its labial position, and on teeth (H), #12, and #13 (**Figure 5**). The latter required sufficient occlusal reduction to permit the creation of a new facial plane far labial to the original position.

The composite materials chosen for this case were a combination of **Renamel Hybrid (Cosmedent)**, and **Renamel Microfill (Cosmedent)**. Since microfills possess roughly ½ the physical strength of hybrids, it is appropriate to place a physically superior composite material like a hybrid in the stress bearing areas of the restoration.⁵ In this case, large diastemata would be closed and subsequently receive occlusal stress in anterior guidance, and the occlusal surfaces of teeth #12 and #13 would be reestablished in a new facial plane. Additionally, hybrid composites often have filler particles with different optical properties than the resin matrix, resulting in various levels of opacity depending on the formulation.⁶

In this case, Renamel Hybrid, shade A1 was chosen provided strength in stress bearing areas, and to act as an opacous block-out of the dark oral cavity in the diastemata. This material would be then veneered with a combination of the SuperBrite 2 shade of the Renamel Microfill, and incisal “edge effects” would be created with the use of the Incisal Medium shade of Renamel Microfill. This “sandwich” technique of combining a hybrid for strength and opacity as the lingual base of the veneers, with the high luster, more vital appearing microfill on the facial surface of the restorations, brings strength and beauty to the restoration (**Figure 6**).

In order to expedite the veneering process, the silicone matrix will be used to rapidly create the majority of the lingual, occlusal, and interproximal contours in one simple step.

Once the teeth are prepared, both the lingual and facial aspects of all the preparations are etched with a 37% phosphoric acid gel (**UltraEtch AB, Ultradent**) for 20 seconds, and thoroughly rinsed, and left moist. Several coats of a 5th generation primer/adhesive (**Prime & Bond NT, Dentsply/Caulk**) to all aspects of the all the preparations, air thinned, and cured with a halogen light. The silicone index is lightly lubricated with and unfilled resin (**ProBond, Dentsply/Caulk**), and ample amount of the Renamel Hybrid A1 was placed predominantly on the lingual aspects of the index. Care was taken to ensure that and adequate amount of hybrid was placed in the index to fill in the interproximal spaces, and extend facially on those teeth that were to be repositioned in a more buccal position (**Figure 7**). Since the facial aspect of the matrix has been cut away, inspection of the interproximal areas was possible, and hybrid material was added in deficient areas. Prior to curing, it is advisable to take a thin composite instrument and carefully sculpt the interproximal embrasure areas such that they are properly aligned with the long axis of the patients face. The hybrid material is then cured from the facial with a high intensity curing light (**Optilux 501, Kerr/Sybron**). Once the facial aspects are cured, the matrix is gently

removed, and the lingual aspects are cured. The excess material is trimmed with a composite finishing bur, the embrasures scored both buccal and lingually with thin diamond point, and the separation was completed with an interproximal saw (**CerisSaw, DentMat**). Interproximal areas are smoothed with diamond impregnated sanding strips (**VisionFlex, Brasseler**), and each tooth is shortened roughly 1 mm to allow for the free-hand creation of incisal edge effects with the microfill (**Figure 8**).

The objectives using an preoperative index are as follows:

- 1. Rapidly close all diastemata**
- 2. Rapidly provide correct lingual contours, and new occlusal schemes**
- 3. Quickly establish proper smile line and incisal edge position**

Since time is valuable to both the patient and practitioner, the use of this index expedites the process tremendously. Within minutes, roughly 80% of the case is complete, leaving only the application of the facial microfill material, and the creation of incisal “edge effects.”

Application of the Body Microfill

The hybrid “substrate” is now ready to receive the body microfill shade(s). Each tooth will be veneered individually and built freehand into direct proximal contact with the adjacent teeth. Since the facial aspects of the hybrid material have been recontoured and the interproximal areas have been smoothed, no air-inhibited layer exists on these surfaces. Dead soft foil material (DenMat) can be placed interproximally to isolate the tooth to be veneered from the adjacent teeth. This dead soft foil is preferred over traditional celluloid strips because it has no memory, and can be folded back away from the working area. The tooth is then etched and rinsed, and several coats of the primer/adhesive are applied and cured (**Figure 9**). By isolating each tooth in this manner, no etchant or adhesive comes in contact with the adjacent teeth. And since the air-inhibited layer

has been removed on these teeth, the foil strip can be removed, and the veneering microfill can be placed in direct interproximal contact with the adjacent teeth without sticking to them.

While it is certainly indicated to place multiple shades of body microfill in many circumstances, significant time can be saved by taking advantage of the inherent translucency of microfills, and placing one shade in deliberately varying thickness across the facial aspect of the tooth. For instance, by tapering the SB2 microfill material to a thin layer at the gingival 1/3 of the tooth, much of the natural gingival tones of the cervical area show through. This creates a very vital and naturally appearing polychromatic variance in one simple step, using only one shade. This same material can be applied in thicker proportions in the central body of the tooth, creating a more saturated hue, and ultimately thinned out again as it approaches the incisal third. This intentional variation in thickness takes for granted that the underlying substrate is either naturally acceptable, or has been properly opaqued with an appropriate opaquer or hybrid.

Creation of Incisal “Edge Effects”

The incisal 1/3 of natural teeth display characterizations that are dependent on the thickness and translucency of the enamel substrate as it becomes thinner at the incisal edge. The appearance of which is a factor of heredity, age, and wear. When repairing Class IV fractures or doing single veneers, the remaining tooth structure or the contralateral tooth should be used as a guide for reconstruction. When performing multiple direct composites, as in the case presented here, the clinician must communicate to the patient the degree of incisal edge characterization available. Many patients desire a “younger looking” smile, and the appearance and shape of the incisal 1/3 of the teeth are the dominant influence in projecting youth. Youthful smiles typically demonstrate more edge translucency, deeper incisal embrasures, and varying degrees of mammelons. More mature smiles typically have less incisal edge translucency, shallow incisal

embrasures, and worn incisal edges.⁷ In this case, the patient is a young female, and she clearly communicated that she wanted a youthful, feminine smile.

After the SB2 shade of the Renamel Microfill was placed in varying thickness over the body of the tooth in full contour, a thin flame-shaped diamond (**Two Striper 201.3F, Premier**) was used to cut back the incisal edge to simulate the labial grooves found in natural dentin. Many clinicians advocate the free hand placement of these grooves upon the application of the body layer with a fine composite placement instrument prior to curing the body layer. In the authors opinion, this requires greater dexterity, and is highly dependent on the working properties of the composite. This technique simply allows the clinician to build multiple teeth to the proper edge position in a rapid fashion, and simply cut back the edges to the desired shape.

The length and depth of these grooves determines the amount of incisal translucency in the final restoration. Therefore more pronounced grooves will yield a more youthful, broader band of translucency, whereas less developed grooves will generate a more mature, subtle band of translucency. Once the desired level of cut back is achieved, the teeth are then isolated with the dead-soft foil, etched, new adhesive is applied, and cured. At this point, a small amount of Renamel Microfill shade Incisal Medium is applied to the incisal 1/3 of the tooth, and is compressed into the dentinal grooves (**Figure 10**). Since this material is moderately translucent, it will allow the darker oral cavity behind the restoration to show through the dentin grooves created in the cut back. This will impart vitality and give the restorations the youthful appearance the patient desired. A sable brush lightly moistened in a small amount of unfilled resin can be used to blend the Incisal Medium material into the body material, and is used to shape and blend the material through the grooves and onto the lingual surface to assure thorough adaptation.

As a final step, a small amount of the SB2 shade is removed from the syringe, and gently “rolled” between the fingers into a tube shape. It is then applied on the incisal edge and blended both buccally and lingually (**Figure 11**). The purpose of this step is to finish the incisal edge in a more chromogenic material, preferably of a very light shade, to provide a high value “halo” on the edge of the tooth. This edge is then sculpted to the desired edge form, blended with a sable brush, and cured.

Finishing and Polishing

Once all the veneers were complete, they were finished by using a 12 fluted carbide finishing bur (**TF 7214, Midwest**) to further blend the layers, and initialize the primary anatomy. An **Enhance Cup (Dentsply/Caulk)** was used at slow speed to contour the gingival 1/3, the lingual margins, and to further accentuate the developmental lobes of the teeth. This was immediately followed by using various grits of the **FlexiDisc** polishing system (**Cosmedent**) at slow speed to contour and polish the interproximal and gingival margins, as well as to define the gingival and incisal embrasures. The final luster was achieved by utilizing both grits of the **FlexiCup** system (**Cosmedent**), followed by the **FlexiBuff** discs with the **Enamelize** polishing paste (**both by Cosmedent**). Though this system is tedious, and time consuming, it offers amazing, durable luster to micro filled composite systems such as the one used in this case.

Post Operative Results

The immediate final result is demonstrated in **Figure 12**. Note the high luster, feminine smile design, well-developed incisal embrasures, and accentuated “edge effects.” **Figures 13, 14 and 15** illustrate the appropriate smile line as properly following the contour of the mandibular lip, closure of the diastemata, and the correction of the unilateral crossbite on the patient’s left side. **Figure 16 and 17** provides a close-up of the variations in color, as well as the natural vitality

that can be achieved with this simplified technique. Finally, **Figure 18** depicts the final post-operative portrait. Note the dramatic changes provided by this valuable service.

Conclusion

It has been said that you can hike to the top of a mountain and experience the sight, sounds, smells, and the feel of each boulder under your feet. You can wade through the streams, battle the underbrush, and scale the face of its rocky crags. Or, you can take a bus to the top. While both reach the summit, which of the two sojourners has a better sense of the complexity of the mountain?

Direct composite veneers seem like an insurmountable “mountain” for many practitioners. But much like the mountain climber, those clinicians that diligently work to improve their skills in direct composite veneers will experience the complexity and beauty the “mountain,” i.e. they will gain significant insight into the creation of color, contour, and a host of other elements of smile design that they may have otherwise delegated to a technician.

By incorporating and refining the techniques presented in this article, the clinician should be able to combat the two biggest obstacles to routinely offering direct composites veneers to his/her patients: Time and esthetic result. By preparing the case in advance on mounted study models, making an index, and utilizing the simplified placement techniques presented, clinical chairtime can be shortened, mistakes avoided, and esthetics guaranteed.

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Legend for Pictures

Figure 1: Preoperative portrait

Figure 2: Preoperative smile

Figure 3: Preoperative retracted frontal view

Figure 4: Silicone index on preoperative wax-up

Figure 5: Preparations on teeth #'s 10, H, 12, and 13. Note the labial reduction of #10 to bring it back into the facial plane, and the required occlusal reduction necessary to permit construction of the new facial cusps in the new facial plane. This will permit the correction of the preoperative crossbite.

Figure 6: The hybrid composite (Renamel Hybrid A-1) will be used to close the diastemata, alter the occlusion, and serve to support the overlying microfill. The microfill (Renamel SB2) will be the dominant body shade and used for the incisal halo. The microfill (Renamel Incisal Medium) is the translucent material used to create the incisal edge characterizations.

Figure 7: The silicone index is loaded with the hybrid material, placed onto the prepared teeth, shaped, and cured.

Figure 8: The excess hybrid material has been removed, the teeth separated, and the preparations shortened approximately 1 mm.

Figure 9: The dead-soft foil matrix isolates each tooth, keeping etchant and adhesive off the adjacent teeth. This permits free-hand building of the composite directly to the adjacent teeth.

Figure 10: The body shade SB2 has been applied in varying thickness, cured and the incisal 1/3 has been cut back. The Incisal Medium shade is applied to the cut back, blended, and cured.

Figure 11: The incisal halo is created out of the high value SB2 material and is applied directly to the incisal edge, blended, and cured.

Figure 12: The immediate post-operative result

Figure 13: Right postoperative smile

Figure 14: Frontal postoperative smile

Figure 15: Left postoperative smile

Figure 16: Preoperative close-up of the right retracted quadrant

Figure 17: Postoperative close-up of the right retracted quadrant. Note the subtle variation of color, closure of the diastemata, development of incisal embrasures, and the incisal edge characterization

Figure 18. Postoperative portrait demonstrating the new smile.